UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/533,688	05/02/2005	Tadashi Maruta	2005_0744A	8652

513 7590 08/01/2008

WENDEROTH, LIND & PONACK, L.L.P.
2033 K STREET N. W.
SUITE 800
WASHINGTON, DC 20006-1021

EXAMINER	
PATEL, VIP	
ART UNIT	PAPER NUMBER
2889	
MAIL DATE	DELIVERY MODE
08/01/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/533,688	MARUTA ET AL.	
	Examiner	Art Unit	
	Vip Patel	2889	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 May 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-54* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-54* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *5/05, 11/05, 3/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-5, 8, 10-15, 18, 21, 23, and 25-28 rejected under 102(b) as anticipated by Nishio et al (US 5856009), of record by Applicant.

Regarding claim 1, Nishio teaches in figures 3 and 5 and the corresponding text, a light emitting apparatus comprising a light emitting element, and a phosphor (50) which absorbs a part of light emitted from said light emitting element and converts it into light with different wavelength, wherein the surface of said phosphor is coated with a coating member (53) which is made of a material different from the phosphor, wherein said coating member is made of a metal nitride (Si3N4).

Regarding claim 2, Nishio teaches coating member coats the surface of said phosphor whereby having a substantially smooth film.

Regarding claim 3, Nishio teaches coating member is formed such that a large number of fine particles relatively smaller than said phosphor aggregate to coat the whole surface of said phosphor.

Regarding claim 4, Nishio teaches the coating member contains Si.

Regarding claim 5, Nishio teaches the phosphor before coating has hydration characteristics (implied by the use of the water protective coating).

Regarding claim 8, Nishio teaches the BET value of said coated phosphor is 1.0 to 10 times the BET value before coating.

Regarding claim 10, Nishio teaches the coating is formed by chemical vapor deposition.

Regarding claim 11, Nishio teaches a phosphor (50) for a light emitting element which absorbs a part of light emitted from the light emitting element and converts it into light with different wavelength, wherein the surface of said phosphor is coated with a coating member (53) which is made of a material different from the phosphor, wherein said coating member is made of metal nitride (Si3N4).

Regarding claim 12, Nishio teaches coating member coats the surface of said phosphor whereby having a substantially smooth film.

Regarding claim 13, Nishio teaches coating member is formed such that a large number of fine particles relatively smaller than the phosphor aggregate to coat the whole surface of said phosphor.

Regarding claim 14, Nishio teaches the coating member contains Si.

Regarding claim 15, Nishio teaches the phosphor before coating has hydration characteristics (implied by the use of the water protective coating).

Regarding claim 18, Nishio teaches the BET value of said coated phosphor is 1.0 to 10 times the BET value before coating.

Regarding claim 21, Nishio teaches that the coating is formed by CVD.

Regarding claim 23, Nishio teaches a method for producing a phosphor for a light emitting element which absorbs a part of light emitted from the light emitting element

and converts it into light with different wavelength, the method comprises steps of: absorbing a reaction precursor onto the surface of the phosphor; and coating the surface of the phosphor with a metal nitride by reacting said reaction precursor with a coreaction material in chemical vapor deposition.

Regarding claim 25, Nishio teaches the coating member is Si.
Regarding claim 26, Nishio teaches the coreaction material is any of oxygen, water vapor and ammonia.

Regarding claim 27, Nishio teaches the method further comprises a steps of thermally treating the phosphor for a light emitting element after coating in a non-oxidation atmosphere.

Regarding claim 28, Nishio teaches the temperature range of said thermal treatment is 150-1000 degrees C and the time is 3 to 10 hours.

Claims 1, 7, 9, 11, 17, 19, 20, and 23-26 are rejected under 102(b) as anticipated by Budd et al. (US 6,458,512), of record by Applicant.

Regarding claim 1, Budd teaches throughout the text, a light emitting apparatus comprising a light emitting element, and a phosphor which absorbs a part of light emitted from said light emitting element and converts it into light with different wavelength, wherein the surface of said phosphor is coated with a coating member which is made of a material different from the phosphor, wherein said coating member is made of a metal oxynitride. (see abstract)

Regarding claim 7, Budd teaches the phosphor is an alkaline-earth silicon oxynitride phosphor.

Regarding claim 9, Budd teaches the average thickness of said coating is 10 nm to 500 nm.

Regarding claim 11, Budd teaches a phosphor for a light emitting element which absorbs a part of light emitted from the light emitting element and converts it into light with different wavelength, wherein the surface of said phosphor is coated with a coating member which is made of a material different from the phosphor, wherein said coating member is made of a metal oxynitride.

Regarding claim 17, Budd teaches the phosphor is an alkaline-earth silicon oxynitride phosphor.

Regarding claim 19, Budd teaches the average thickness of said coating is 10 nm to 500 nm.

Regarding claim 20, Budd teaches the phosphor is charged to a negative surface potential before coating.

Regarding claim 23, Budd teaches a method for producing a phosphor for a light emitting element which absorbs a part of light emitted from the light emitting element and converts it into light with different wavelength, the method comprises steps of: absorbing a reaction precursor onto the surface of the phosphor; and coating the surface of the phosphor with a metal nitride by reacting said reaction precursor with a coreaction material in chemical vapor deposition.

Regarding claim 24, Budd teaches the reaction precursor is an organic metal. Regarding claim 25, Budd teaches the coating member is Al or Si.

Regarding claim 26, Budd teaches the coreaction material is any of oxygen, water vapor and ammonia.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.
>
> If this application currently names joint inventors, in considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 6 and 16 are rejected under 103(a) Nishio in view of Takahashi et al. (US 2002/0043926), both of record by Applicant.

Regarding claim 6, Nishio teaches all of the claimed limitations except for the use of an alkaline earth silicon nitride phosphor. Further regarding claim 6, Takahashi teaches a light emitting device comprised of, in part, an alkaline earth silicon nitride phosphor for the purpose of having a long lifetime emitting phosphor. Hence, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the phosphor of Takahashi in place of the phosphor of Nishio for the purpose of having a long lifetime emitting phosphor.

Regarding claim 16, Nishio teaches all of the claimed limitations except for the use of an alkaline earth silicon nitride phosphor. Further regarding claim 16, Takahashi

teaches a light emitting device comprised of, in part, an alkaline earth silicon nitride phosphor for the purpose of having a long lifetime emitting phosphor.
Hence, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the phosphor of Takahashi in place of the phosphor of Nishio for the purpose of having a long lifetime emitting phosphor.

Claims 29-41 are rejected under 103(a) Takahashi et al. in view of Nishio, both of record by Applicant.

Regarding claim 29, Takahashi teaches in figure 1 and throughout the text, a nitride group phosphor which converts at least a part of light with first emission spectrum into light with at least one second emission spectrum in the range different from said first emission spectrum, comprising: a nitride group phosphor material containing N (where N is nitrogen). Takahashi does not disclose a coating material which is made of any of metal oxide, metal nitride and metal oxynitride and coats said nitride group phosphor material such that the BET value of the coated phosphor is 1.0 to 10 times the BET value before coating.

Further regarding claim 29, Nishio teaches a phosphor having a coating material which is made of any of metal oxide, metal nitride and metal oxynitride and coats the nitride group phosphor material such that the BET value of the coated phosphor is 1.0 to 10 times the BET value before coating for the purpose of increasing the lifetime of the phosphor by protecting it from the outside environment. Hence, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the

protection coating of Nishio on the phosphor particles of Takahashi for the purpose of increasing the lifetime of the phosphor by protecting it from the outside environment.

Regarding claim 30, Nishio teaches the coating material is a metal nitride group material. The reason for combining is the same as for claim 29 above.

Regarding claim 31, Nishio teaches the coating material forms a micro capsule. The reason for combining is the same as for claim 29 above.

Regarding claim 32, Nishio teaches the coating material has a multi-layer structure formed of a plurality of different materials. The reason for combining is the same as for claim 29 above.

Regarding claim 33, Nishio teaches the coating material of the multi-layer structure has a high refractive index on said phosphor side, and a low refractive index on the surface side. The reason for combining is the same as for claim 29 above.

Regarding claim 34, Takahashi teaches said phosphor is a nitride group phosphor represented by L-M-N:R or L-M-O-N:R (where L contains at least one element selected from the group consisting of Be, Mg, Ca, Sr, Ba, and Zn, M contains at least one element selected from the group consisting of C, Si, Ge, Sn, Ti, Zr, and Hf, N is nitrogen, O is oxygen, and R is a rare earth element).

Regarding claims 35-38, Takahashi teaches the use of the phosphor Ca-Al-Si-O-N. Determining the optimum formula of these elements is an obvious choice in design which could be accomplished without undo experimentation.

Regarding claim 39, Takahashi teaches the crystal structure of said phosphor is a monoclinic system or orthorhombic system.

Regarding claim 40, Takahashi teaches phosphor contains a B element.

Regarding claim 41, Takahashi teaches phosphor member absorbs a part of light emitted from said light emitting element and emits light with different wavelength. Claims 42-54 are rejected under 103(a) Takahashi et al. in view of Budd, both of record by Applicant.

Regarding claim 42, Takahashi teaches in figure 1 and throughout the text, a nitride group phosphor which converts at least a part of light with first emission spectrum into light with at least one second emission spectrum in the range different from said first emission spectrum, comprising: a nitride group phosphor material containing N (where N is nitrogen). Takahashi does not disclose the phosphor being charged to a negative surface potential before coating of the phosphor and a coating material which is made of any of metal oxide, metal nitride and metal oxynitride and coats said nitride group phosphor material.

Further regarding claim 42, Budd teaches the phosphor being charged to a negative surface potential before coating of the phosphor having a coating material which is made of any of metal oxide, metal nitride and metal oxynitride and coats the nitride group phosphor material for the purpose of increasing the lifetime of the phosphor by protecting it from the outside environment. Hence, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the protection coating of Budd on the phosphor particles of Takahashi for the purpose of increasing the lifetime of the phosphor by protecting it from the outside environment.

Regarding claim 43, Budd teaches the coating material is a metal nitride group material. The reason for combining is the same as for claim 29 above.

Regarding claim 44, Budd teaches the coating material forms a micro capsule. The reason for combining is the same as for claim 29 above.

Regarding claim 45, Budd teaches the coating material has a multi-layer structure formed of a plurality of different materials. The reason for combining is the same as for claim 29 above.

Regarding claim 46, Budd teaches the coating material of the multi-layer structure has a high refractive index on said phosphor side, and a low refractive index on the surface side. The reason for combining is the same as for claim 29 above.

Regarding claims 47-51, Takahashi teaches the use of the phosphor Ca-Al-Si-O-N. Determining the optimum formula of these elements is an obvious choice in design which could be accomplished without undo experimentation.

Regarding claim 52, Takahashi teaches the crystal structure of said phosphor is a monoclinic system or orthorhombic system.

Regarding claim 53, Takahashi teaches phosphor contains a B element.

Regarding claim 54, Takahashi teaches phosphor member absorbs a part of light emitted from said light emitting element and emits light with different wavelength.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vip Patel whose telephone number is (571) 272-2458.

The examiner can normally be reached on 5.30am- 2pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Toan Ton can be reached on (571) 272-2303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Vip Patel/
Primary Examiner
AU 2889